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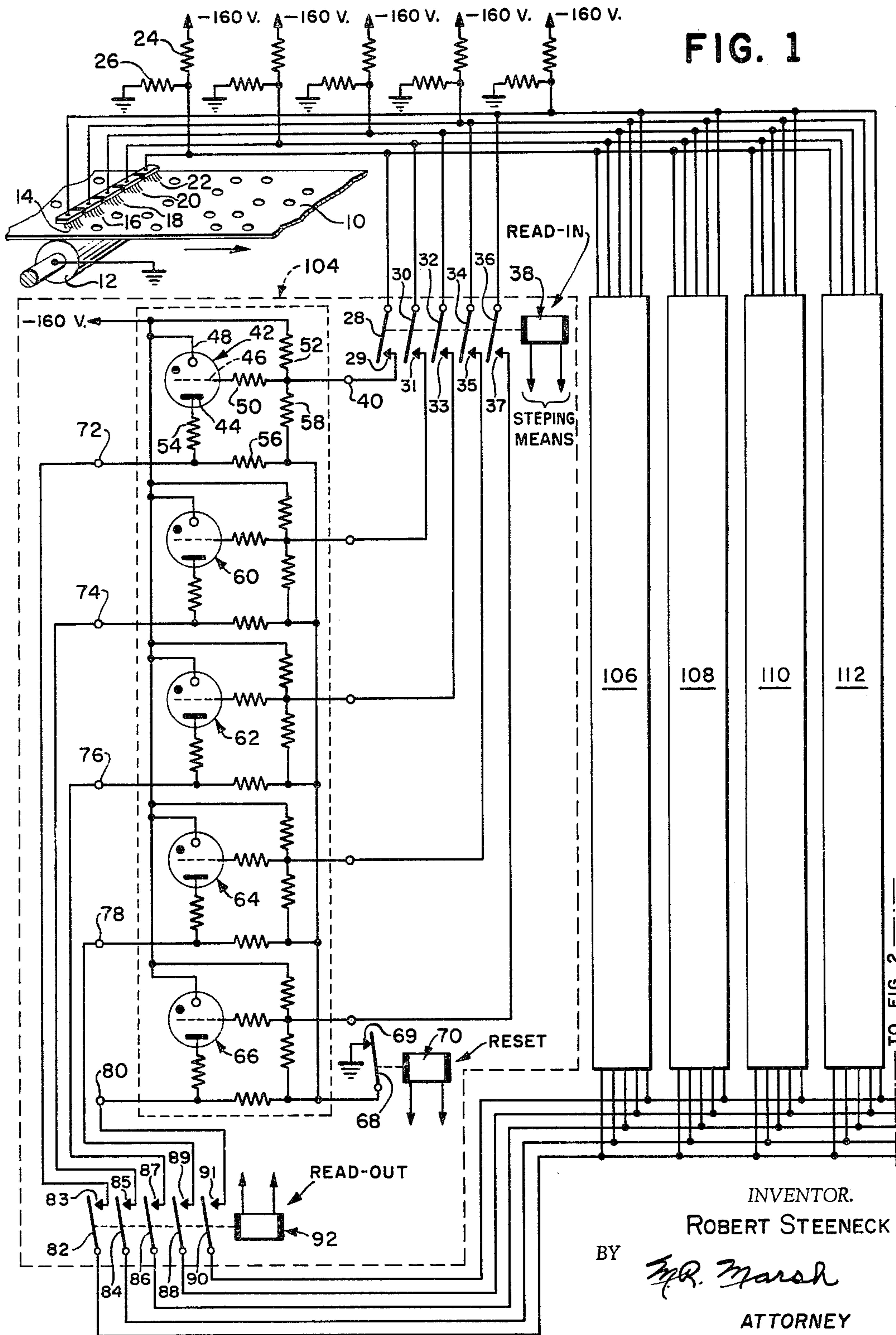
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3,227,956

STORAGE NETWORK COMPRISING A NEON TUBE

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2 Sheets-Sheet 1



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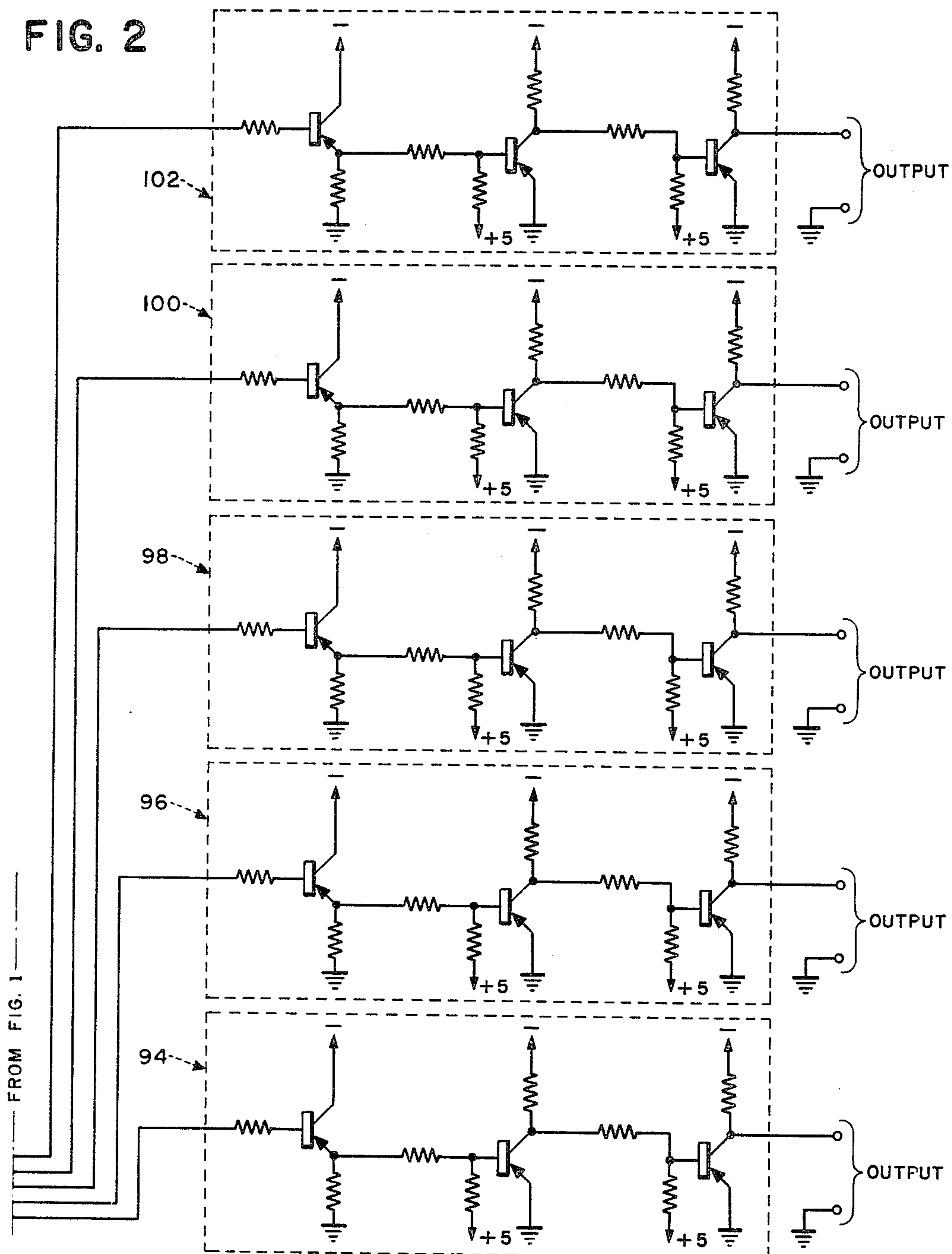
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FIG. 2



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STORAGE NETWORK COMPRISING A NEON TUBE

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1 Claim. (Cl. 328—210)

This invention relates generally to a storage or memory device and more particularly to a storage device which utilizes glow discharge type of devices as storage members.

It is a primary object of this invention to provide a device which utilizes a glow discharge type of tube as a storage element.

It is another object of this invention to provide a device which presents a visual indication of the information stored.

It is still another object of this invention to provide a device which can be reset to its initial or inactive state quickly and easily.

It is also an object of this invention to provide a device which is economical to build and reliable in operation.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the apparatus becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIGS. 1 and 2 when positioned side by side, FIG. 1 to the left of FIG. 2, shows a schematic diagram of structure in accordance with the principles of this invention.

Briefly, in this invention, a glow discharge device such as a neon lamp or the like is coupled to a resistive network to form an assemblage having an input terminal, an output terminal, and a reset terminal. Application of an appropriate potential to the input terminal urges the neon lamp to assume its conductive state, and application of an appropriate potential to the reset terminal urges the neon lamp to its nonconductive state. The output terminal displays a potential representative of the state of the neon lamp.

With reference to FIG. 1, a tape 10 having desired information recorded in the form of punched holes similar to the teletype style of code or the like is fed between electrical brushes and a conductive roller 12.

There are five brushes 14, 16, 18, 20, and 22, one for each code level of information on the tape which, when aligned with a cutout in the tape, contact a ground terminal through the conductive roller. Each brush is coupled to a voltage divider network and through a make-break switch contacts the grid network of a glow discharge type of device such as a neon lamp. Brush 14 is coupled to a source of negative potential through a resistor 24 and to a ground terminal through a resistor 26. Brush 14 is also coupled through the movable contact 28 and stationary contact 29 of relay 38 to input terminal 40 of the resistor network associated with the first neon lamp 42. The neon lamp further identified as type NE77 manufactured by General Electric was found to operate in a satisfactory manner. It is to be understood, however, that this invention is not limited to the neon lamp as manufactured by General Electric and that neon lamps manufactured by other manufacturers can be used with success. This lamp supports three elements which, for convenience shall be referred to as an anode terminal 44, a grid terminal 46, and a cathode terminal 48.

The grid terminal 46 of the neon lamp 42 is coupled through a resistor 50 to the input terminal 40; the cathode terminal 48 is coupled through a resistor 52 to the input terminal 40; and the anode terminal 44 is coupled through the series combination of resistors 54, 56, and 58 to the input terminal 40.

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Each of the other brushes 16, 18, 20 and 22 are coupled in a similar manner to a source of negative potential and through the relay 38 to a neon lamp—brushes 16, 18, 20, and 22 being coupled to lamps 60, 62, 64, and 66 respectively.

A source of negative potential is coupled to the cathode terminal of each neon lamp; and the common junction of the resistors 56, 58 associated with each neon lamp is coupled through a movable contact 68 and a fixed contact 69 of a reset relay 70 to a ground terminal.

The junction terminal interposed between the resistor 54 and the resistor 56 of each neon lamp is the output terminal. The output terminals 72, 74, 76, 78, and 80 of the neon lamps are coupled to the stationary contacts 83, 85, 87, 89, and 91 respectively of the readout relay 92.

Each movable contact of the readout relay 92 is coupled to the input terminal of an amplifier. The movable contact 82 is coupled to the amplifier 94; contact 84 is coupled to amplifier 96; contact 86 is coupled to amplifier 98; contacts 88 is coupled to amplifier 100; and contact 90 is coupled to amplifier 102. Each amplifier is a three-stage transistorized network which amplifies the signal fed from the output terminals of the neon lamp network.

In operation, there is provided one or more neon tube or lamp assemblages 104 to permit the storage simultaneously of a multitude of characters. In FIG. 1 there are illustrated five neon tube assemblages 104, 106, 108, 110 and 112. The read-in relay 38 of each assemblage is coupled to a stepping means which is synchronized to operate with the occurrence of the coded characters on the tape. The stepping means couples sequentially each lamp assemblage to the brushes such that each next appearing coded character on the tape is fed to the next appearing neon lamp assemblage.

With the appearance of the first character as represented by cutouts in the tape being positioned to cooperate with the brushes, the readin relay of the tube assemblage 104 is activated and signals are fed from the brushes to the input terminals of the tubes. The presence of a cutout in the tape couples the associated brush to a ground terminal and the related neon tube fires and assumes its conducting state—which it maintains. Thus, if the first character position read has cutouts in the first, second, and last position (reading from the bottom) of the tape, then the brushes 14, 16 and 22 will be coupled to a ground terminal through the cutout and the conductive roller and the neon tubes 66, 64 and 42 will be urged to assume their conductive states. Continuing, the tape advances and the second appearing character perforated on the tape appears under and cooperates with the brushes. At this instant the read-in relay of the tube assemblage 104 is deenergized and the read-in relay of the tube assemblage 106 is energized to couple the brushes 14, 16, 18, 20, and 22 to the input terminals of associated tubes, and the procedure is repeated—that being that the presence of a cutout in the tape operates to urge a cooperating tube to assume its conductive state. This procedure continues until each one or as many as desired tube assemblage contain sensed information.

At the appropriate instant the readout relays of the tube assemblages are sequentially activated to couple the output terminals of the neon lamps to the amplifiers—each amplifier being associated with a lamp which represents a particular code level on the tape. Thus, amplifier 102 and the signal appearing at its output terminals represents the first code level (that associated with brush 14); amplifier 100 and the signal appearing at its output terminals represents the second code level (that associated with brush 16); and so on for the amplifiers 98, 96, and 94 each representing the third, fourth and fifth code levels respectively. Now, upon activation of the

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readout relay 92 of assemblage 104, each lamp that is in a conducting state will feed a negative potential from its output terminal through the readout relay to the associated amplifier to generate a signal representative of the presence of a cutout in the tape—and each lamp that is not in a conducting state will feed a less negative (practically zero) potential from its output terminal through the readout relay to the associated amplifier to generate another signal representative of the absence of a cutout in the tape.

Shortly, thereafter, the readout relay of the assemblage 104 is deenergized and the readout relay of the assemblage 106 is energized and another discrete pattern of signals appear at the output terminals of the amplifiers 94, 96, 98, 100, and 102 representative of the signals previously sensed and stored. This cycle continues with each of the assemblages until all of the information that has been stored is “read-out.”

At the same instant subsequent to the “read-out” of the information in the assemblage 104 (and each of the other assemblages) and prior to the storing of other information, the reset relay 70 is energized and each neon lamp that was in its conducting state is urged to assume its non-conducting state. Naturally, the reset relays of the neon lamp assemblage can be energized either sequentially or simultaneously.

With respect to the components associated with each neon lamp, and referring to the neon lamp 42, the resistor 50 is used to limit the flow of grid current; resistors 52 and 58 form a voltage divider network to maintain a normal non-firing grid potential; resistors 54 and 56 are

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used to limit the flow of plate current; resistors 54 and 56 also function as a voltage divider network.

Obviously, many modifications and variations of the present invention are possible in the light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

A storage network comprising a neon tube having an anode terminal, a cathode terminal and a grid terminal; an input terminal; a first resistor coupled between the grid terminal and said input terminal; a reset terminal; a second resistor coupled between said input terminal and said reset terminal; a third resistor in series with a fourth resistor coupled between said reset terminal and said anode terminal of said neon tube; an output terminal coupled to the junction of said third resistor with said fourth resistor; a power supply terminal coupled to the cathode terminal; a fifth resistor coupled between the cathode terminal and the input terminal; reset means coupled to said reset terminal and comprising contacts coupled selectively to a ground terminal; and an amplifier fed by said output terminal.

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